УДК 91(09)

ВОЕННЫЙ ХИМИК КРАМИДА

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Рассказано о последнем периоде краткой, но по-своему яркой жизни заведующего спецлабораторией Сибирского химико-технологического института (ныне ТПУ) Константина Павловича Крамида.

«Энтузиасту химической обороны страны» – такую надпись на пирамиде памятника одной из могил на кладбище в Томске можно было прочитать лет 70 назад. Здесь был похоронен в гробу с окошечком 38-летний действительный энтузиаст военно-химического дела, проводивший на себе испытания боевых отравляющих веществ в одной из лабораторий химического корпуса Сибирского химико-технологического института (СХТИ, нынешнего ТПУ).

По семейному преданию появление греков Крамида в России связывают с постройкой дворцов фаворитом Екатерины II светлейшим князем фельдмаршалом Потемкиным: будто бы тогда на Украину был приглашен из Греции архитектор Крамида и ему было пожаловано одно из небольших сел [1]. К.П. Крамида родился 21 сентября 1895 г. в г. Кишиневе Бессарабской губернии в дворянской семье кадрового офицера и учительницы. Мальчик решил пойти по стопам отца: сперва учился в Одесском кадетском корпусе (окончил в 1912 г.), потом в Михайловском Артиллерийском училище в Москве. В связи с началом войны с Германией в 1914 г. состоялся ускоренный выпуск юнкеров и К.П. Крамида направляется на фронт. В своей автобиографии Константин Павлович указывает [2]: «... За время войны был дважды отравлен газами и контужен в голову». Дальнейшее военное образование: в 1917 г. окончил 6-месячные курсы летчиков-наблюдателей, а в 1923 г. – краткие курсы высшей химической школы. Желание продолжить образование в Военной технической академии оказалось в разладе со здоровьем, в академию принят не был и «... так как командование не считало возможным уход с должности, повышал квалификацию путем сдачи испытаний экстерном ...» – пишет о себе Константин Павлович [2].

В февральскую революцию 1917 г. офицер К.П. Крамида избирается членом Петроградского Совета рабочих, крестьянских и солдатских депутатов. Октябрьскую революцию встретил выборным командиром батареи и стал членом комиссии по формированию Красной Армии. Во время гражданской войны участвовал в боевых операциях в составе одной из частей РККА против Деникина, Врангеля, Махно, в ликвидации мятежей на Северном Кавказе и в Тамбовской губернии. Не избежал К.П. Крамида и кратковременного пленения соратниками «батьки» Махно («... был раздет и избит ...» [2]). В 1919 г. на фронте была парализована левая нога (впоследствии подвижность ноги восстановилась; перенес он и сыпной тиф), что и повлекло переход Константина Павловича на педагогическую деятельность сначала при политотделе 2-ой Конной Армии и 16-ой кавалерийской дивизии, а по окончании гражданской войны в различных органах Т.В.Ч.З. (?, так в автобиографии [2] – автор).

Свое появление в Томске Крамида описывает следующим образом [2]: «... В 1926 году мне была объявлена благодарность по войскам Сибирского Военного Округа за работу по военно-химическо-

му делу, после чего я свою деятельность концентрировал на изучении военной химии, окончательно наметив ее как свою узкую профессию. В 1928 г. я по распоряжению Сибирского Военного Округа был прикомандирован к СТИ (Сибирский технологический институт) на химический факультет для повышения квалификации как преподаватель военной химии и в 1929 г. получил 4-х месячную командировку на Слав.(янский) Сод.(овый) завод, где мною выполнено 2 работы (работал на заводе в качестве сменного инженера ...».



Заведующий спецлабораторией Сибирского химико-технологического института К.П. Крамида (1895–1933 гг.)

3.09.1929 г. декан химического факультета профессор Илья Аркадьевич Соколов представляет в Правление СТИ прошение: «Преподаватель военной химии К.П. Крамида во время пребывания на Славянском содовом заводе собрал большую коллекцию материалов по минеральной технологии и технологии отравляющих веществ. Желательно коллекцию приобрести для СТИ». Принято решение: перевести в Славянск 50 рублей.

Прикомандирование к СТИ сыграло решающую роль в личной жизни Константина Павловича. На одном из студенческих вечеров в Томском университете великолепный танцор с военной выправкой и студентка физико-математического факультета Катя Соколова, старшая дочь профессора физики СТИ И.А. Соколова, обратили друг на друга внимание. После преднамеренных посещений университетской библиотеки в дни дежурств юной томички (дежурство в научной библиотеке студентов – обычай тех лет) и чтения любимых книг студентки («Сирано де Бержерак», «Портрет Дориана Грея» и др.), отказа на сделанное предложение не последовало и Константин Павлович вошел в профессорскую семью любимым зятем.

В 1930 г. произошло личное знакомство К.П. Крамида с видным деятелем большевистской партии и государства Н.И. Бухариным, который произвел на военного химика очень благоприятное впечатление. После московской встречи среди домашних Константин Павлович часто восклицал [1]: «Кто такой этот Иоська Сталин? Вот Бухарин – это да!» В автобиографии же написано [2]: «... В 1930 году после спецсовещания в Москве получил предложение организовать спецлабораторию и работать в ней в качестве аспиранта СХТИ, что мною и выполнено ...». От себя добавим – ценой невосполнимой. «... В 1930 году после отравления был признан комиссией негодным к дальнейшей службе в армии по здоровью и уволен со снятием с учета с назначением пожизненной пенсии без переосвидетельствования. Состояние здоровья и сейчас неважное в связи с вредностью профессии ...» [1].

Одним словом инвалид в неполные 35 лет! Однако какого иного исхода можно было ожидать от смертельно опасных опытов на самом себе! Из рассказов Е.И. Крамида (Соколовой) [1]: «... Бывало, найду в воскресенье записку. – «Милая Катюша, обязательно приди ко мне в лабораторию ровно в 12 дня». Спешу в химический корпус (благо квартира в соседнем физическом корпусе – автор). Перед плотно закрытой дверью химической аудитории – ключ и листок бумаги с указанием, как нам вести себя, чтобы не отравиться, как его приводить в чувство. Заходим. Он без сознания, а рядом – дневник наблюдений: какие признаки отравления были в какой именно последовательности – резь в глазах, сухость во рту, судороги и т.д. Все по минутам, золотые часы – рядом». (После окончания физмата Томского госуниверситета Е.К. Крамида с 1931 г. до 1939 г. работала ассистентом кафедры математики (высшей математики) СХТИ (с 1934 г. ТИИ) и Томского электромеханического института инженеров транспорта (ТЭМИИТ); с 1939 г. – ассистент кафедры высшей математики РИИЖТа [3]).

Как следует из полученных сведений, Константин Павлович занимался исследованием отравляющих веществ под названием арсины (AsH_3). Это бесцветный, очень ядовитый газ с чесночным запахом. С физиологической точки зрения отравление мышьяковистым водородом усугубляется тем, что первые признаки отравления (озноб, рвота и др.) появляются обычно лишь спустя несколько часов после вдыхания AsH_3. Основным средством первой помощи является свежий воздух при полном покое пострадавшего [4]. Инструктивными вопросами быстрой диагностики отравляющих газов, эффек-

тивной помощи пострадавшим бойцам в полевых условиях и конструктивным решениям противогазов массового производства были озабочены помыслы аспиранта Крамида.

«... Осенью 1933 года его послали в командировку в Новосибирск. Иммунная система его была расшатана опытами с БОВ; он вторично заболел сыпным тифом и в поезде 12 ноября умер ...» [1].

Так оборвалась короткая жизнь одного из энтузиастов пролетарского государства. Из воспоминаний дочери [1]: «... Мама с горечью говорила: – Папа Ваш умер вовремя. Что было бы с ним в 37-м? Расстреляли бы неминуемо. Доносы-то были! ...» Действительно, уже в 1930 г. в томской газете «Красное Знамя» (№ 226 от 9.10.1930 г.) была помещена заметка «Так научную смену не подготовляют», в которой негативно характеризуется бывший офицер царской армии полковник К.П. Крамида. В защиту аспиранта вступились начальник, комиссар и ответственный секретарь партбюро Томской артиллерийской школы: в заметке, по их мнению, «... допущена грубейшая политическая ошибка в части, касающейся бывшего преподавателя артиллерии и химии ТАШ т. Крамида Константина Павловича ... более чем десятилетняя плодотворная работа в рядах РККА, безусловно, не может дать даже и малейшего намека на то, чтобы считать его классово чуждым элементом. Что касается его общественной работы – то командование и общественность школы знают его как одного из активных работников ОСО Авиахима, работающего на этой работе буквально с момента зарождения этой организации (в прошлом: ВНО Добролет, Доброхим и т.п.)».

Со слов жены Константина Павловича, адресованных дочери [1], «... совершил лишь один-единственный должностной проступок. Спецлаборатории выделили метров 40 черного сатина для занавешивания окон в химической аудитории. Увидев, как его коллеги-женщины тоскливо щупают ткань (в те годы купить ее было невозможно!), отец распорядился раздать им несостоявшиеся занавески ...».

Обращают на себя внимание некоторые строки из автобиографии нашего героя: «... Первой печатной работой была компилятивная статья «Полковая артиллерия», написанная в 1922 г.». Открытость характера позволяла Константину Павловичу чувствовать себя комфортно в любой среде – «... его любили солдаты в армии, студенты в аудитории,



Первый выпуск кафедры основной химической промышленности СХТИ (1931 г.).
Преподаватель К.П. Крамида в верхнем ряду первый слева

коллеги в лаборатории» [1]. В год похорон Константина Павловича его сын Евгений (Геня) был мальчиком 4-х с половиною лет. Удивительным образом безрассудная готовность к самопожертвованию поселилась и в нем. Е.К. Крамида окончил в 1953 г. физико-математический факультет Ростовского госуниверситета (И.А. Соколов, его дед по матери, в 1939 г. был избран профессором и заведующим кафедрой физики Ростовского н/Д института инженеров железнодорожного транспорта [5]) и работал старшим научным сотрудником в Институте физики СО АН СССР в г. Красноярске в области рентгеноспектрального анализа. В 1963 г., после серьезного облучения рентгеновскими лучами, он согласился принять участие в ремонте кобальтовой пушки, в которой в змеевидной детали застрял радиоактивный элемент. Когда иные попытки устранить неисправность не дали результата, сын «энтузиаста химической обороны страны» без средств защиты устранил ее за несколько секунд вручную. Это облучение сыграло в его жизни роковую роль: умер в 56 лет (непрерывно тяжело болел, имел на пальце незаживающую рану [1]).

Автор выражает благодарность Елене Константиновне Чирковой, до брака Крамида, родившейся в г. Томске в 1932 г., ныне проживающей в Волгограде, за воспоминания о своем отце, на основании которых и написана настоящая печальная «повесть».

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Summaries

UDC 514.753.28

R.N. Scherbakov, N.R. Scherbakov
NONHOLONOMIC COMPLEXES IN THE EQUIAFFINE SPACE

The paper continues to study nonholonomic geometric images. The simplex of reference of the nonholonomic line complex has been constructed. The splitting of notions of affine centre, congruence *W*, and main regulus is observed which is typical of nonholonomic geometry.

UDC 519.865

A.V.Anikina, N.S. Demin
PROBABILISTIC METHODS IN STUDYING THE EUROPEAN OPTION

The paper studies the cost, the portfolio and the capital for the European look-back call option when payment of dividends in continuous time takes place.

UDC 51-7(519.21,519.216,519.217)

D.N. Zhabin, E.S. Kholopova
STOCHASTIC PROCESSES WITH CORRELATED INCREMENTS AND THEIR UTILISATION

The notions of stochastic integral and stochastic differential are introduced for processes with correlated increments. The application of stochastic integrals and differentials for describing the capital market is considered. It is shown that despite the suppositions of the classical efficient market hypothesis, the processes of changing securities profitability are the processes of correlated increments. Having this in view, the analogue of the Fokker-Plank-Kolmogorov equation is obtained which can be used for determining the probability density of the process of share cost changing.

UDC 681.3.06

Yu.B. Burkatovskaya, A.N. Malchukov, A.N. Osokin
FAST ALGORITHMS OF POLYNOMIALS DIVISION IN ARITHMETIC MODULO 2

The paper suggests the fast algorithms of polynomials division in arithmetic modulo 2 which enable to process data in the parallel form, namely: modification of the algorithm of simultaneous determination of the top and the least significant quotient digits. It also proposes the matrix algorithm of polynomials division. The example of implementing the endec encoder-decoder of the scale-of-two cyclic noise combating code which uses the matrix algorithm of accelerated polynomials division is given. The implementation is demonstrated on FPLD of the Altera Company.

UDC 553.411.071.242.4+550.4

I.V. Kucherenko
MINERALOGICAL-PETROCHEMICAL AND GEOCHEMICAL FEATURES OF WALLROCK METASOMATISM IN ACID ROCKS OF GOLD-PRODUCING FLUIDIC IGNEOUS COMPLEXES

The paper studies the dikes of acid ores of the Irokindinskoye and Kedrovoye mesothermal gold deposits of the Northern Transbaikalia. These dikes have the appearance of subvolcanic formations known as felsite- porphyrites. The data on their mode of occurrence, geologic aspects, mineral and chemical composition, and petrochemical properties are given. The dike rocks are diagnosed as moderately alkaline biotite difeldspathic basoquartz microgranite porphyrites. The order of mineral zoning, the mineralogical-petrochemical features of apodike near-vein metasomatic halos and their belonging to the beresite metasomatic formation are shown. Formation of geochemical anomalies of noble metals in dikes at the stage of near-ore metasomatism and ore formation is proven. Participation of dikes in the content of gold-producing fluidic igneous complexes of the Late Paleozoic is discussed.

UDC 550:361:553.982

I.G. Yashchenko
ANALYSIS OF SPATIAL, TIME AND GEOTHERMAL CHANGES OF HIGH-VISCOSITY PETROLEUM CRUDE OILS OF RUSSIA

The paper analyses spatial, time and geothermal distribution of high-viscosity petroleum crude oils of Russia. The dependence of high-viscosity petroleum crude oils presence upon occurrence depth, oils age and the level of thermal flux is revealed. The analysis of regular viscosity changes of the considered petroleum crude oils depending on the depth of occurrence shows that their absolute majority (over 82 %) is located at the depths of up to 2000 m. Average viscosity values get smaller with the increase in the depth of occurrence. It is shown that over 74 % of high-viscosity petroleum crude oils of Russia are located in the Paleozoic deposits. Using geothermal and oil-and-gas bearing zoning by the example of petroleum crude oils of Russia and, in particular, those of Western Siberia, it is shown that viscosity of oils decreases with the rise in the thermal flux level.

UDC 550.4:665.61

S.S. Yanovskaya, T.A. Sagachenko, A.V. Shikalin, O.V. Serebrennikova
NITROGEN IN THE UPPER JURASSIC DISPERSED ORGANIC MATTER AND OILS IN WEST SIBERIA

The data are given on the distribution of nitrogen-containing compounds in the oils and dispersed organic matter (DOM) of potential Upper Jurassic oil-source rocks of West Siberia. A relationship between the content of different types of nitrogen-containing compounds in the DOM and the conditions of its accumulation, thermal maturity degree, and genetic type has been established.

UDC 530.1:621.397:535

S.M. Slobodyan
DIFFUSION OF IMAGE COORDINATES IN VIDEO SURVEILLANCE DEVICES

The paper analyses the diffusion process of random image drifts in video surveillance devices. It is shown that diffusion of image drift is, on the analogy of the Brownian motion, a persistent process, while the trajectory of random image drifts can serve as an example of the self-affine fractal.

UDC 621.362.1:66-971

Yu.V. Babushkin, V.P. Zimin
MATHEMATICAL SUPPORT FOR SIMULATING THERMOIONIC EMISSION SYSTEMS

The paper describes the mathematical support designed for conducting scientific and project research of processes taking place in thermionic converters, power-generating elements, and power-generating assemblies.

UDC 537.521

V.V. Zhukov, V.P. Krivobokov, V.V. Patsevich, S.N. Yanin
PROPERTIES OF DIRECT CURRENT MAGNETRON DISCHARGE. P. 2. FEATURES OF CHARGE TRANSFER

Basing on the probe measurements of electric potential in near-cathode areas of plasma, the structure of the dc magnetron discharge is investigated. It has been found, that at quite low voltage values (≤250 V), the structure of the discharge looks similar to that of a glow one, while at higher voltage values, the important role in the discharge formation is played by the process of self-spraying of the target which is the integral attribute of the magnetron discharge. The bidimensional model of spreading electronic current from the discharge

zone has been built for the set configurations of the spraying system electrodes. It is shown, that the position of the anode relative to the magnetron exerts a great influence on distribution of Hall current in the discharge zone, while the magnetic field facilitates division of the discharge into some zones with various current densities.

UDC 621.372.4:537.52

Yu.N. Isaev, V.A. Kolchanova, O.P. Spilnaya, E.O. Kuleshova
AN ALGORITHM FOR DETERMINING THE PARAMETERS OF OZONE PLANT ELECTRIC EQUIVALENT CIRCUIT WHEN EXPOSED TO IMPULSE VOLTAGE

An algorithm for determining the parametres of ozone plant electric equivalent circuit is described which is based on the calculation of electric field. The calculation of electric field of non canonical shaped electrodes in inhomogeneous water-air media is presented. The calculation of the field is based on the solution to the ill-posed Fredholm's integral equation of the first kind. Inhomogeneous uncontrolled media is caused by drops of water. Therefore, it is suggested to calculate the parameters of ozone plant equivalent circuit with the use of noisy oscillograms of current and voltage based on the Duhamel's integral-the incorrect Fredholm's integral equation.

UDC 537.52

A.N. Grigoryev, A.V. Pavlenko, A.P. Ilyin, E.I. Karnaukhov
SURFACE ELECTRIC DISCHARGE.
PART 1. PECULIARITIES OF SURFACE DISCHARGE DEVELOPMENT AND EXISTENCE.

On the basis of the literature data, the peculiarities are shown that condition development and existence of the discharge on solid dielectrics surface. The fields are shown where surface discharge is applied due to the possibility to obtain it in multi-channel form. The second part will present the experimental results which concern studying operation modes of a high-current surface discharge switch.

UDC 537.333

V.P. Grigoryiev, T.V. Koval
EXTERNAL MAGNETIC FIELD INFLUENCE ON LOW ENERGY HIGH CURRENT ELECTRON BEAM SELF FOCUSING

The paper deals with the theoretical studies of transportation and focusing of an electron beam propagating in a drift tunnel in proper and external magnetic fields. The drift tunnel is filled with low-pressure air ranging1...10^{-2} Pa. It is found that non-homogeneity of the external magnetic field plays a crucial role in transporting an electron beam compensated by charge. It is shown that by changing the magnetic field value and its gradient it is possible to control current density of a beam on the target and distribution of electrons according to energy.

UDC 66.023.2

I.A. Tikhomirov, D.G. Vidyaev, A.A. Grinyuk
BASIC PARAMETERS AND CHARACTERISTICS OF AMALGAMATE-EXCHANGE COLUMN

The paper describes the method for determining the basic parametres of the amalgamate-exchange column, namely: the separation (enrichment) factor, number of theoretical plates, height, equivalent to a theoretical plate, changes in the amalgam flow with the account to decomposition and the exchange flux value.

UDC 539.125.5

V.I. Boiko, P.M. Gavrilov, I.V. Shamanin, M.G. Gerasim, V.N. Nesterov
CRITICAL NEUTRON-PHYSICAL PARAMETRES OF URANIUM-THORIUM AND PLUTONIUM-THORIUM ALLOYS

The paper analyses the possibility of safe storage of raw nuclide Th^{232} alloys with basic odd-even nuclides U^{235} and Pu^{239}. The ratios are obtained for determining the maximum admissible values of uranium and plutonium nuclei concentration in alloys, and the results of the neutron-physical calculations are stated.

UDC 537.29

V.I. Boiko, M.A. Kazaryan, I.V. Shamanin, I.V. Lomov
EFFECT OF ASYMMETRIC HIGH-FREQUENCY ALTERNATING FIELD ON BRINES

The paper describes the physical-mathematical model and technical implementation of the drift process when the brine is exposed to asymmetric high-frequency alternating field. The effects of current excitation (in case of isolated flat electrodes) and selective drift of isotopically different solvated aqua complexes are determined as a result of the experiments and calculations. The possibility of using the selective drift effect for isotopic and elemental enrichment (depletion) of brines is shown.

UDC 544.032

N.V. Borisova, E.P. Surovoi, I.V. Titov
MECHANISM OF COPPER FILM CHANGES IN THE COURSE OF HEAT TREATMENT

Copper films thicker than 4 nm exhibit typical for copper strip absorption ranging from λ=300...1100 nm and vice versa. In consequence of thermal treatment under the atmospheric conditions, fine copper films' (3...100 nm) thickness, mass, and absorption spectrum change dramatically within the temperature range 373...600 K and time range 1...120 min. This fact was established owing to spectrometrical, gravimetrical, and microscopical methods. It was shown that kinetic curves of conversion degree, samples' thickness and mass alteration can be described within the frames of either linear, parabolic, or logarithmic laws versus both the initial copper films' thickness and thermal treatment temperature. It was stated that copper films' absorption spectrum, thickness, and mass change due to copper oxide (I) formation on their surface.

UDC 541.18:546.57

E.V. Anischenko, G.V. Lyamina, N.M. Korshikova, G.M. Mokrousov
INFLUENCE OF SOLVENT ON THE PROCESS OF METAL IONS RECOVERY WITHIN THE SYSTEM OF ARGENTUM TRIFLUORIDE ACETATE – ORGANIC SOLVENT – METHACRYLIC COPOLIMER

With the help of atomic force microscopy, voltammetry, and optical spectroscopy the influence of media components on the process of argentum nanoparticles formation in the composite solvent consisting of methyl cellosolve, butyl acetate, and toluene and also in the methacrylic copolymer solvent with methyl-acrylic acid was established. Butyl acetate and toluene additives increase stability between argentums ion complexes and methyl cellosolve. Copolymer molecules containing in the solvent prevent nanoparticles coarsening and slow down the deposition process.

UDC 546.77:546.78:546.25

E.B. Chernov, E.E. Chernova, V.M. Plotnikov, I.V. Sidorenkova
SYNTHESIS AND EXAMINATION OF HETEROPOLY COMPOUNDS PROPERTIES OF DECATUNGSTOGERMA NATES AND DECAMOLYBDOGERMATES WITHIN THE COMPOSITION $XZ_{10}O_{36}^{n-}$ WHERE X – Ge, Z– Mo, W

Synthesis and chemical analysis of sodium decatungstogermanates and decamolybdogermates heteropoly compounds was carried out. Their properties were examined with the help of the following methods: IR and UV spectroscopy, viscosimetry, derivatography, kinetic and luminescent analyses. The structure of the compounds was found with the help of molecular mechanics method. The possibility of decamolybdogermates application in the capacity of luminophore and in the course of new anticancer agents' development was shown.

UDC 544.3:622.331

S.G. Maslov, L.I. Tarnovskaya
THERMODYNAMICS OF COMPOUNDS ADSORPTION WITH HUMIC ACIDS

Adsorption process of organic compounds (n-alkanes, cycloalkans, alkenes, ethers, compound ethers, cyclic esters, ketones, spirits,

aromatic and chlorine-substituted hydrocarbons) with humic acids of initial and heat-treated pits by gas chromatographic method was investigated. The aim of the investigation was to define adsorption and thermodynamic parameters. Having respect to solid fossil fuels and basing on methods of nuclear magnetic resonance spectroscopy, humic acids characteristics were given.

The dependence between physical and chemical characteristics and holding values with adsorbent were found. Differences in adsorption processes with humic acids of initial and heat-treated pits were stated. The reason was high concentration of heat-treated pit and aromatic constituent in heat-treated samples. Interrelation between thermodynamic probability of the adsorption process with humic acids and adsorbate polarity was shown.

UDC 665.64

D.I. Melnik, S.A. Galushin, A.V. Kravtsov, E.D. Ivanchina, V.N. Fetisova
PRODUCTION RUN EFFICIENCY INCREASE OF REFORMING PLANTS ЛЧ-35-11/1000 AND ЛГ-35-8/300Б IN KIRISHINEFTEORGSENTEZ ON THE BASIS OF CATALYST WORK CONTROL SYSTEM

The perspective of application of catalyst work control system based on both plant information network system and data bases of technological process automated control system was considered. The possibility to decrease coke production, when operated at the mode of optimal activity with the help of mathematical modeling method was demonstrated. The existing automation scheme aimed at both engineering information obtaining and analyzing, which are considered to be essential to fulfill calculations was described. This scheme was in process of elaboration.

UDC 665.12.001.57

A.V. Kravtsov, N.V. Usheva, N.A. Baramygina
MODEL-BASED APPLICATION ELABORATED TO ANALYSE OPERATING PLANTS OF DEETHANIZATION AND GAS CONDENSATE STABILIZATION

Model-based system, which allows to make calculations of stabilization processes, optimize operating industries, and plan new ones was described. Basic characteristics of goods stream produced with the help of deethanization and stabilization plant of gas-condensate field in the North Vasjugan and stabilization column of Luginetsk gas compressor station were shown.

UDC 541.63:547.298.11/.16

E.V. Petrenko, M.L. Belyanin
THEORETICAL RESEARCH OF CALYX[4]ARENE AS A MODEL FOR NANOSTRUCTURES SYNTHESIS. PART 1. INFLUENCE OF UPPER RIM SUBSTITUENTS

Energetic and geometric characteristics of calyx[4]arene and its derivatives substituted along the upper rim with 1) bromine(-Br), 2) iodine (-I), 3) tret-butil substitute (-t-C_4H_9) were found with the help of molecular mechanics method (MM+), quantum chemistry, and nonobservational method B3LYP/LanL2DZ using DFT approach. Calculation results are quite alike: the influences of upper rim substitutes of small-size affect molecules geometry not sufficiently. Those of bigger size can change the whole structure dramatically.

Preliminary calculations for calyx[4]arene with tailed phenylacetylene chains were carried out. The purpose of such calculations was to make a model, which would be used in organic nanostructures synthesis.

UDC 621.762

G.N. Romanov, P.P. Tarasov, P.K. D'yachkovski, A.P. Savitski, L.S. Martsunova
DILATOMETRIC INVESTIGATIONS OF Al-Ti SYSTEM LIQUID-PHASE SINTERING

Pressings on the basis of aluminum powder containing titanium powder, the amount of which ranged from 5 to 20 at. % were under vacuum sintering within dilatometer's quartz tube at the following temperature: 700, 800, and 900 °C. Due to heat emission the sample sizes underwent some changes in the course of alloy building. The process of changes was very complex and it took place at the time when the temperature of compact sintering also changed. Dilatometric curves and sintering thermogram analysis also based on X-ray research and microstructural research was carried out. A probable bond between volumetric and temperature changes of pressings was considered. During the process of sintering intermetallic compound $TiAl_3$ was formed and the phenomenon of particles rearrangement of hard phase within the bath was observed.

UDC 539.12.04:669.14.255:691.793

V.P. Sergeev, A.R. Sungatulin, O.V. Sergeev, G.V. Pushkareva
NANOHARDNESS AND ENDURING QUALITY OF 38ХН3МФА AND ШХ-15 HIGH-RESISTANCE STEELS IMPLANTED WITH IONS (Al+B), (Ti+B), Ti

The way nanohardness and facial layer of steels samples 38ХН3МФА and ШХ-15 change in the course of irradiation with ions beams (Al+B), (Ti+B), and Ti was studied. The increase of mechanical properties in the course of irradiation with composition of ions was found out. The effect increases when irradiation is increased. The enduring quality increases significantly when steels are irradiated with (Al+B) ions. The same can be said about nanohardness when it is irradiated with (Ti+B) ions. The results interpretation was based on the change of structural-phase condition and elementary composition of boundary layer in the course of implantation. This change was studied basing on transmission electronic microscopy and mass spectrometry methods of secondary ions.

UDC 678.5

N.N. Minakova, A.Yu. Bortnikov
CARBON FILLER INFLUENCE ON ELECTRICAL CONDUCTIVITY STABILITY OF FILLED POLYMERS WHEN IT CONTACTS WITH LIQUID MEDIA

Polymers behavior filled with superfine technical carbon within corrosive liquid media was considered. It was stated that technical carbon contribution to the stability of volumetric electric resistance is not limited by dispersion and structural properties parameters when the work within corrosive liquid media is fulfilled. By the example of furnace technical carbon it was shown that the surface organic compounds, which selectively react to the type of dissolvent play a very significant role.

UDC 621.791.763

S.F. Gnyusov, A.S. Kiselev, M.S. Slobodyan, B.F. Sovetchenko
CONTACT RESISTANCE STABILIZATION IN THE COURSE OF SPOT MICROWELDING

Influence of the law of variation of heating current pulse on contact resistance stabilization in the course of spot microwelding was estimated. Optimal impulse amplitude and time parameters when producing spacer grids 0,25 mm thick, using steel Э110 were defined.

UDC 621.791.03

V.T. Fedko, O.G. Brunov, A.V. Kryukov, V.V. Sednev
WELDPOOL MODULATION AND OPTIMIZATION OF ITS TIME PARAMETERS

The possibility of weldpool modulation in accordance with its critical volume quantity was considered. The equation for determination of pool's critical volume and three-dimensional position was determined. Modulation time parameters values were optimized.

UDC 621.791.75.037

D.A. Chinakhov, O.G. Brunov
WELDING WITH ELECTRODE WIRE IMPULSE FEEDING OF ANNULAR COUPLING 30ХГСА

The problem concerning welding of medium alloy martensitic and bainitic steels into slotted splitting was considered. Welding based research results carried out with electrode wire impulse on steel 30ХГСА were described. It was stated that this type of welding provides reliable joint quality and welds efficiency with slotted splitting.

UDC 536.24:692.2:691.11:519.711.3

A.Ya. Kuzin, A.N. Khutornoi, N.A. Tsvetkov, S.V. Khon, T.A. Miroshnichenko
MATHEMATICAL MODELING OF NON-STATIONARY TWO-DIMENSIONAL HEAT TRANSMISSION WITHIN NON UNIFORM WOODEN OUTER SHELL

Thermal condition of non-uniform outer wooden shells in the form of heated timber and log was investigated with the help of mathematical modeling. Heat-protective comparative analysis was conducted. Developed numeric technology allows to conduct heating instinct exclusion of outer heat-insulated wooden walls with various thermophysical and geometrical characteristics of wood and heat insulation under real operating conditions.

UDC 621.923

R.K. Kalbiev
INVESTIGATION OF TENSION STATE WITHIN HEXAGONAL PLATE WEAKENED BY ROUND ROUGH CENTER HOLE

This work was devoted to the studies of tension state of hexagonal plate bounded with hexagonal contour on the outer side and inside it was bounded with aperture located in the center close to circular one. The sate of tension for multiply connected areas was considered basing on the theory methods of complex alternating and conforming reflection functions. The functions were represented in the form of exponential series the coefficients of which were determined by nonterminating systems of linear algebraic equation solution.

UDC 621.833.3

A.B. Vinogradov
BASIC CHARACTERISTICS OF GEOMETRIC CALCULATION OF MACHINE LINKAGE

Methodic and development of formula to calculate basic geometric characteristic of enveloping worm machine linkage when grinding its turns by flat/junction instrument were represented.

UDC 622.233.5

A.N. Glazov
ESTIMATED DEPENDENCES OF STATIC MODEL OF PNEUMATIC MECHANISM OPERATING PROCESSES

Static model of operating processes within chambers of pneumatic mechanism was considered. Estimated dependences were obtained to define working chambers' and pneumatic mechanism's characteristic features basing on indicator diagrams. The equations to define working chambers admission were given. Calculation results of optimal admission and specific gas discharge of rear from the rod chamber for polytropes indices equal to 1,4 and 1,0 for the processes of air expansion and compression were shown. These calculation results were obtained with the help of personal computer.

UDC 681.518

M.S. Khazov
CORRELATION COEFFICIENT ESTIMATION OF DIAGNOSED EQUIPMENT MALFUNCTION OF LOCOMOTIVE

Mathematical estimation methods of locomotives malfunctions correlation were considered. Optimization method of diagnosed parameters was represented. Possibilities to predict technical conditions of diagnosed object were shown.

UDC 621.313

P.F. Bekishev, D.Yu. Lyapunov
MATHEMATICAL MODELING OF CAPACITIVE FILM MICRO ENGINE

Application of low power capacitive film engines within devices of micro motion was explained. Mechanism, design, and basic operating laws of capacitive film micro engines were considered. System dynamic characteristics were obtained. On the basis of these characteristics the main requirements to the feed and control systems were determined.

UDC 621.313.333:62-83:519.87

P.R. Baranov, Yu.N. Dementev, I.G. Odnokopylov
ASYNCHRONOUS ENGINE MATHEMATICAL MODEL WITH INSTALLED ELECTROMAGNETIC DRIVE OF CONTROL SYSTEM

Asynchronous engine mathematical model with electromagnetic braking devise cut into the brake of stator phase was introduced. Engine model was described with the help of equation within three-phase delayed co-ordinates, which helped to take into consideration electromagnet influence installed into one of the stator phases. Mathematical model implemented on the basis of Delphi (as a program) allows to calculate basic dynamic operation modes of asynchronous engine with electromagnetic breaking devise. Besides, emergency power rating can also be calculated.

UDC 621.311.6

V.M. Rulevski, Yu.N. Dementev, O.V. Bubnov
MASS CHARACTERISTICS OF POWER-SUPPLY SYSTEM IN THE FUNCTION FROM OPERATING DEPTH OF REMOTELY CONTROLLED SUBMERSIBLE CRAFT

Theoretical and experimental results of research aimed at influence of power-supply system structure and elements of remotely controlled submersible craft were demonstrated. Besides, transmission method of energy along the conducting rope with the reference to mass characteristics of the system in the function of operating depth was shown.

UDC 621.321.6

A.N. Selyaev, A.M. Gavrilov, I.E. Grebenev, A.A. Antonov
DEFINITION OF ORDER LEVELS OF DISTURBANCE ELECTROMAGNETIC FIELDS OF SEMICONDUCTOR CONVERTERS ON THE DESIGN STAGE

The paper describes the mathematical model of semiconductor pulse converter based on the solution of the system of Maxwell differential equations and definition of current levels and shapes in commutatable and sneak circuits using SAPR OrCAD. Software that allows the estimation of radiated electromagnetic fields on the design stage by the converter is developed.

UDC 621.311.6

A.T. Potapov, V.V. Shkorkin, A.N. Selyaev
ELECTRONICS PROTECTOR FROM PULSE COMMUTATABLE DISTURBANCES IN AIRBORNE CIRCUITS OF THE DIRECT CURRENT

The paper considers electronics protector from high energy pulse disturbances that occur in extensive power systems of the direct current. The device provides power continuity of the protected unit at the occurrence of pulse commutatable disturbances in airborne circuits. In addition, the energy of powerful disturbances does not disperse the heat but is used for loading power supply. Practical recommendations on the increase of protector load-carrying capacity are given.

UDC 621.384.001.63

V.V. Redko, L.A. Redko
HIGH VOLTAGE MEASUREMENT IN PULSED DEVICES OF INSULATION CABLE DRY TESTS

Indirect measurement of the output pulsed voltage amplitude in high voltage insulation testers is suggested. Reasons of disturbances occurrence are analysed. Recommendations on the choice of testing parameters that provide necessary measurement accuracy are given.

UDC 621.317.53.08

V.I. Tuev
MEASUREMENT OF TWO-TERMINAL NETWORK RESISTANCE USING THE IMPULSE SIGNAL

The paper considers the measurement method of two-terminal network overall resistance including the measurement of complex resistance module (inaccuracy ±7 %) and its real part (inaccuracy ±3 %) using the impulse signal. Structural scheme of the device is sug-

gested, recommendations on the choice of generator frequency value and a measuring circuit are given.

UDC 621.316

I.R. Pivchik
CALCULATION OF TERTIARY HARMONIC CURVES AND ESTIMATION OF THEIR INFLUENCE ON TRANSFORMERS

The paper presents calculations of current tertiary harmonic curves and transformers voltage. Voltage and current equations at "m-power" polynomial flow approximation are obtained.

UDC 621.313.333:658.562

O.O. Muravleva, T.V. Usacheva
ECONOMIC EFFECTIVENESS EVALUATION IN INDUCTION MOTORS MANUFACTURING

Mathematical model of economic effectiveness evaluation in induction motors manufacturing on the design and production stages is developed. The analysis of the target function for quality level optimization shows that the cost of the used materials does not exceed 0,28 % and, therefore, it is reasonable to design and manufacture induction motors with high material expenses in order to increase their energy characteristics.

UDC 681.142.3

S.V. Shidlovsky
AUTOMATIZATION OF REARRANGEABLE STRUCTURES SYNTHESIS

The paper considers the logical system of simulation technique for synthesis and investigation of computing environment with rearrangeable structures. Analytical and structural forms of multifunctional logical modules are shown.

UDC 004.94;004.946;519.7;519.711

O.M. Zamyatina, N.G. Sanochkina, I.G. Ozerova
ADAPTATION OF THE ERP STANDARD TO THE CONDITIONS OF MODERN RUSSIAN ENTERPRISES

The paper describes the problem of adaptation of the ERP standard to the conditions of Russian enterprises. The paper is devoted to the development of the efficient method of ERP-system installation at enterprises. ERP-systems, such as Axapta 3.0 and MFG/PRO were considered to achieve this goal and their functioning algorithms were observed. Operating models of business processes using the example of Tomsk enterprises are also developed. ERP systems and business process models are set using one common method. A new method of adaptation of the ERP standard to the conditions of Russian enterprises is offered based on the comparison and analysis of the above mentioned models.

UDC 338:316.422(47+57)

V.V. Guzyr
FORMATION OF RUSSIAN NATIONAL INNOVATIVE SYSTEM IS A STEP ON THE ROAD TO QUALITY OF LIFE ECONOMY

The paper describes the notion on "the level of life", "quality of life", as well as their typical rates and indicators. Problems connected with the creation of Russian national innovative system and innovative economy are discussed and analysed. It is determined that the main problem of creating Russian innovative economy is lack of business motivation to the change in the structure of the economy. The need to develop the economy on the basis of innovations for the formation of the quality of life economy is shown.

UDC 330.47

N.D. Barkalova, V.P. Komagorov
FORMATION AND INVESTIGATION OF PROJECT RISKS DYNAMIC MODEL IN THE DEVELOPMENT AND EXPLOITATION OF OIL AND GAS DEPOSITS

The paper describes the formation of a base project risks dynamic model in the development and exploitation of oil and gas deposit "Sakhalin-2" and the adaptation of this model to the investment project of one of oil and gas deposits development in Tomsk Oblast taking into account repetitive stages of the deposit life cycle.

UDC 37:01;301:151

L.N. Antropyanskaya, L.V. Shabanov
UNITY AND CONTRADICTIONS OF INFORMATIZATION AND HUMANIZATION IN THE SPHERE OF DISTANT EDUCATION

New educational technologies are established and constantly improved in today's open man-caused community. Available familiarization with specific features of distant education may help students to develop creative approach to their future profession. That is why distant education is considered not only as the process of transferring knowledge and skills but as a mechanism of forming personal qualities of a young competitive specialist.

UDC 17

I.B. Ardashkin
"ANTROPOLOGIZATION" AS A PROBLEMATISATION FACTOR IN COGNITION

The process of antropologization of knowledge through methods of knowledge problematisation is considered in the paper. The conclusion on the fact that ontological pluralism demands the appropriate method of overlapping of the different beginnings, which problematisation is implemented on the basis of abilities of the person to learn the world is made. The complementary principle and antropical principle express the indicated features of problematisation of knowledge of the person.

UDC 316.7

O.T. Loiko
SOCIAL MEMORY TEXT ONTOLOGY

The paper analyses basic philosophical concepts indicating the relation of a social memory to its text existence. Philosophical understanding of the stated problem is shown in the context of present ontological change in modern philosophy. Great emphasis is placed on the text existence in Russian culture.

UDC 130.2+165

V.E. Budenkova
COMMUNICATION AND RATIONALITY AS THE BASIS OF TOLERANCE

The paper discusses basics and limits of tolerance. Communication and its philosophical "version" – communicative ontology are considered the basics of tolerance in modern culture. Tolerance is not possible without common values and common responsibility which are formed in a rational dialogue. So, rationality does not determine only the limits of tolerance, but it helps to expand them. Such features of dynamic rationality as complementerity, self-reflectivity, situativity transform tolerance from some abstract idea into effective rule of interpersonal and intercultural relations.

UDC [316.42+008](47+57)

T.I. Suslova

THE PROBLEM OF TRANSLITERATION OF OLD RUSSIAN MYTHOLOGICAL NOTIONS IN MODERN AESTHETIC CONSCIOUSNESS

The paper considers philosophical and aesthetic concepts of aesthetic transformation presented in the aspect of historical and civilizational approach. The notion of "transformation aesthetics" of Old Russian morphological notions into modern cultural community is formed. Innovative interpretation and introduction of the notion of transformation into aesthetics will allow further investigation of modern creative works by means of actualization of aesthetic cultural foundations. The paper may serve the basis for further methods of modern aesthetic development.

UDC 378:001

V.V. Petrik

FORMATION AND DEVELOPMENT OF MAIN ORGANIZATIONAL FORMS OF UNIVERSITY SCIENCE AT THE END OF 1950s – BEGINNING OF 1990s. (SIBERIAN HIGHER SCHOOL)

The paper analyses formation and development of new organizational forms of scientific research in Siberian universities at the end of 1950s – beginning of 1990s (research institutes, departments, and branch and problem laboratories). Such problems as coordination and planning of research, expansion of academic and university science cooperation, participation of Siberian scientists in scientific congresses, conferences, and meetings are described in detail.

UDC 373.5

O.M. Stepanova, N.V. Kozlova, Yu.Yu. Kryuchkov, M.A. Soloviev

INTRODUCTION OF PROBLEM-ORIENTED TECHNOLOGIES INTO THE EDUCATIONAL PROCESS IN TECHNICAL UNIVERSITIES

The paper summarizes the experience of introducing problem-oriented education into the Bachelor's of physics training in TPU department of natural science and mathematics. It suggests the programme of introducing problem-oriented technologies into the educational process.

UDC 371.048

N.S. Mikhailova, M.G. Minin

MODELING OF THE DEVELOPING DIDACTIC TEST EXPERTISE

The paper describes organizational and pedagogical conditions of pre-test expertise, which contribute to the development of the evaluation methods in the sphere of educational achievements. It also considers the object, purposes, stages, possible methods of conducting the adequate expertise. Expertise content defining the evaluation criteria and parameters are presented in detail.

UDC [553.493.5+553.495]:55(09)

L.P. Rikhvanov, A.A. Potseluev, V.A. Domarenko

INVESTIGATION OF RARE METAL AND URANIUM DEPOSITS OF THE CENTRAL ASIA AT TOMSK POLYTECHNIC UNIVERSITY

The paper presents history and basic results of scientific research of rare metal and uranium deposits of the Central Asia obtained by teachers and employees of TPU Institute of Geology and Oil ad Gas Industry. Brief information on the research carried out since the beginning of the 20th century until present is provided. The paper reflects close relation of research and highly qualified specialists' training to the industrial activities of geological organizations.

UDC 51(09)

V.N. Belomestnykh

MILITARY CHEMIST K.P. KRAMIDA

The paper deals with the last few years of a short but an outstanding life of the head of special laboratory of Siberian Chemical and Technological Institute (at present TPU) Konstantin Pavlovich Kramida.